BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 5 JULY 1961 PART 23

INSTITUTE NEWS

New Staff Appointments

The Council has appointed Mr. S. O. SCHOFIELD, A.A., C.C.A., A.C.I.S., as Accountant, and Mr. L. B. SAYERS as Administrative Assistant. Mr. Schofield was formerly accountant to the Shaftesbury Society, London.

Instructional Meeting for Younger Members, Cardiff, 12–16 April 1961

One of the main objects of the Institute is to facilitate the exchange of ideas between those members engaged in science and those engaged in the production and fabrication or in the use of non-ferrous metals. The Instructional Meetings for Younger Members that have been arranged by the Metallurgical Engineering Committee are a very direct and successful way of achieving this object. The meeting held at Cardiff from Wednesday 12 April to Saturday 15 April, at which the subject was "Preheating and Hot Rolling of Flat Products", provided an opportunity for such exchange which was taken up and put to good use by twenty members from leading fabricating companies in the country, together with one very welcome member from Denmark. The members included some who were more experienced than might have been expected from the description "younger", but they, together with the directing staff, agreed that they had benefited from the instructional aspect of the meeting thus emphasizing that these meetings can be of value not only to Student and Junior Members but also to any member who is willing to listen and learn.

The meeting was held in pleasant surroundings at University Hall, Cardiff. Like the previous two meetings, it was arranged on the basis of syndicate working, those attending being divided into syndicates; each syndicate discussed a particular subject and presented a report for discussion by the whole meeting. Five subjects were given for syndicate study. In abbreviated form these were:

1. Preparation of a scheme for the modernization of an existing hot-rolling plant for copper and brass to give a 50% increase in capacity.
2. Preparation of a broad specification for a new hot mill to roll 7000 tons a year of aluminium and alloy products.
3. Preparation of a scheme for preheating the ingots to be rolled on the mill discussed by Syndicate 2.
4. Consideration of the techniques of ingot preparation, preheating, and hot rolling, with emphasis on the factors affecting operating efficiency and quality control.
5. Comparison of the hot-rolling techniques in the steel and non-ferrous industries and a discussion of future trends in the non-ferrous industry.

After the preliminary introductions on the Wednesday afternoon, the syndicates were briefed by the Directors and Assistant Directors of Studies, Mr. T. W. Hood and Mr. P. T. L'Appell, of W. H. A. Robertson and Co., Ltd., and Alcan Industries Limited, respectively, and Mr. M. J. Falconer and Mr. J. R. Hartree of the same two companies. Then the syndicates immediately started on the discussion of their subjects in order to outline their approach and decide on questions to be asked during the works visits to be held on the following day.

On the Thursday a visit was paid to the Rogerstone Works of Alcan Industries, Ltd., to see and study the preheating and hot-rolling equipment. Much of this equipment had been installed and commissioned very recently and excited great interest. The visit was expertly organized with guides who were fully competent to deal with the questions of the syndicate members, and with coffee and an excellent luncheon provided at the appropriate times.

The afternoon visit was to the Ebbw Vale works of Richard Thomas and Baldwins, Ltd. This was an unusual visit for the Institute, but was of great interest to this meeting. The similarities and contrasts with the Rogerstone Works were marked by everyone, and it was agreed that a visit such as this to a large steelworks was an essential part of the education of any practising metallurgist. The coach journeys up the Sirhowy and down the Ebbw valleys provided a fascinating view of a part of the country that many members did not know.

Discussion continued on Thursday evening, when the answers to the questions asked during the visits were brought into the syndicates' studies. Friday morning was spent in further discussion and the preparation of syndicate reports.

CONFERENCE ON "THE METALLURGY OF BERYLLIUM"

Members are reminded of the international conference on "The Metallurgy of Beryllium," arranged by the Nuclear Energy Committee, that is to be held at the Royal Commonwealth Society, Northumberland Avenue, London, W.C.2, on 16–18 October 1961.

A detailed programme of the meeting will shortly be sent to all members.

Presentation of syndicate reports started on Friday afternoon. The meeting was very fortunate that Professor H. Ford, Chairman of the Metallurgical Engineering Committee, was present for the last two days and was persuaded to take the chair during the discussion of syndicate reports, from which position he enlivened the discussions with ideas from the worlds of research and theory. Presentation and discussion of syndicate reports took all Friday afternoon and part of Saturday morning.

Syndicate 1 showed a truly modern approach by achieving their increase in production largely by using programme control for the mill to increase operating efficiency. Syndicate 2, a group of four metallurgists, made a very competent study of the engineering problems to be tackled when laying down a new mill. Syndicate 3 presented a sound scheme for preheating and came to appreciate the problems of forced-convection furnace design. The broad subject covered by Syndicate 4 brought home the hard facts of the economic basis of the plant metallurgist's work and led to a considerable discussion of " coating "—a beloved subject for hot rollers of aluminium. Syndicate 5's report ranged through all known types of rolling plant and dwelt at length on the use of continuously cast strip. Economics took a large place in this discussion, during which the meeting was taken aback by the suggestion that aluminium fabricators should consider cold breaking down of ingot as is used by many brass rollers.

The discussions, both in the syndicates and in the whole meeting, were lively and the standard of report presentation was outstanding, considering the small amount of time available for preparing the reports. The works visits provided a common experience for all members and so acted as a focus for the meeting. The fact that these were works visits with a purpose, and were treated as such by the host companies, greatly increased their value to all the members. There was no doubt at all that at this meeting the Institute was achieving its object in facilitating the exchange of ideas and also achieving the aim of the meeting in encouraging younger members to take an active part in discussions.

J. R. Hartree

Informal Discussion on " Tube Production "

A General Meeting of the Institute was held in the Lecture Theatre, College of Advanced Technology, Gosta Green, Birmingham, on Wednesday, 22 February 1961. It took the form of an informal discussion on " Tube Production." Professor H. Ford, Vice President and Chairman of the Metallurgical Engineering Committee, occupied the Chair.

In a brief introductory statement, the Chairman said that the Meeting was to be opened by a paper given by Mr. W. F. Morris, of Reynolds T.I. Aluminium, Ltd., Redditch, followed by a further one by Mr. W. L. Govier, from Yorkshire Imperial Metals, Ltd., Smethwick.

Mr. Morris's paper dealt with aluminium and its alloys, and Mr. Govier's with copper-base alloys, and both dealt very effectively with the methods and equipment used in tube manufacture. These papers are to be published in the *Journal*.

After lunch, a short film illustrating the impact extrusion of tubes, lent by Fielding and Platt, Ltd., was shown.

The discussion was opened by Mr. C. Smith, (James Booth Aluminium, Ltd.), who discussed the problem from a metallurgical angle, and indicated the development of methods throughout the last 100 years or so. He gave some details of the manufacture of brazed brass tubing and referred to the difficulties arising in using modern mass-production machines in a market in which the variety of sizes was so great. He suggested that some attention might be devoted by engineers to the manufacture of equipment which would produce a large variety of sizes, rather than a heavy tonnage of tubes of the same size, the reason being that the market did call for very large tonnages of tubes of widely varying sizes and gauges.

Mr. F. a'Brassard (Elm Engineering, Ltd.) suggested that the problem would best be solved by persuading customers to take the sizes which were available. He thought that standardization should be extended to the user industry to a greater degree than at present.

Mr. M. Donovan (Bristol Aerojet Co., Ltd.) gave an interesting account of the welding of strip wound helically in order to make tube. He said that tubes could be made in stainless steels, titanium, aluminium, or any other material. He suggested that a method of this kind might be suitable for dealing with a wide variety of sizes.

Mr. F. A. Batty (The Head Wrightson Machine Co., Ltd.) showed pictures of a multi-strand tube-reducing mill which he said was suitable for the mass production of large quantities of tube of similar sizes, and he gave an interesting account of the use of such a machine in combination with bull blocks for finishing.

Mr. N. D. Benson (Marshall Richards Machine Co., Ltd.), in a written contribution, gave details of the development of the tube draw block to the stage where continuous lengths of tube several thousands of feet could be drawn at speeds in the region of 2000 ft/min.

Mr. D. Boxall (British Non-Ferrous Metals Research Association) suggested that the best solution of the problem of producing small quantities of a large number of different sizes of tube lay in the hands of the stockists, or alternatively, small firms could do the re-drawing from standard sizes of tube to awkward sizes. He discussed the virtues of horizontal versus vertical extrusion presses for producing copper tubes and asked whether one should nowadays use horizontal presses rather than vertical presses for the manufacture of tube blooms.

After the film display showing the impact extrusion of aluminium tubes, Mr. C. Smith (James Booth Aluminium, Ltd.) opened the discussion again. He discussed the way in which the two different industries had grown up, indicating that the copper-base industry had a much longer history, and hence began with more primitive methods of manufacture, and that the aluminium industry had come into the manufacture of tubes very much later and hence was able to profit to some extent by the experience of the older industry. He gave some information on the way in which processes had developed and improved over the years, indicating that at the present time it was possible to extrude the most refractory materials by means of better presses, better steels, better tools, and an improvement in lubrication practices, including the use of molten glass.

He followed this by a discussion on the various metallurgical problems which had arisen over the same period, referring to the season-cracking of both brass and aluminium alloys, and discussed the general question of the corrosion of brass condenser tubes and the various steps which had been taken over the years to increase their resistance to impingement attack, dezincification, and the like. He concluded by a discussion on the modern practices of crack detection and a list of some of the thousand and one uses to which tubes were put.

Mr. C. H. Pattman (Serck Tubes, Ltd.) spoke of the improvement in tube quality which had consistently gone on over the years, indicating that the demands of users had become more and more onerous until in some cases they asked for something which was very nearly impossible. He discussed the casting of billets for tube manufacture, referring particularly to the advent of the water-cooled mould, which he thought had led to a very great improvement in tube quality. He discussed the manufacture of tube by impact extrusion, the manufacture of slugs as well as the extrusion process itself.

Dr. F. Trotter (New Rochelle Thermatool Corp.) described the high-frequency welding of tubing by the New Rochelle Process. He spoke of the welding of very thin-walled tubes in the range 0·008–0·010 in., which could be done either by lap meshed welding and rolling down the seam while the metal was still plastic, or by spiral welding, using either butt or lap meshed welding. He indicated that accurate dimensions could be obtained without subsequent re-drawing.

Mr. F. W. Morris, one of the original authors, gave some interesting information about the manufacture of taper tubes, including details of the lengths and diameters which could be produced. He also gave an account of the manufacture of butted tubes, the butt being either internal or external. He indicated that tubes could be produced with localized thickened walls in the centre as well as at the ends. He stated that taper tubes were used for lighting columns.

Mr. J. T. Lewis (The Loewy Engineering Co., Ltd.) referred to recent developments in the cold extrusion of aluminium. He supported those engineers who thought that mechanization of equipment to mass produce large quantities was the right course to pursue.

Mr. Beckwith (The Head Wrightson Machine Co., Ltd.) thought that the use of automatic equipment was right, but felt that the use of limit switches and the like could be overdone. He thought that it was necessary to use a little care and intelligence in the application of equipment of this kind, and discussed the virtues of various kinds of pointing or swaging machines for the pointing of tubes. He also discussed the virtues of push pointing and again indicated that careful thought needed to be given to a particular process and the particular application which would be most suitable for mass production.

PERSONAL NOTES

Lord Baillieu has been awarded the Gold Medal of the Institution of Mining and Metallurgy in recognition of his distinguished services to the Commonwealth mining and metallurgical industries.

Mr. D. G. Hughes has left the Atomic Weapons Research Establishment and has taken up an appointment as research metallurgist with the Glacier Metal Co., Ltd., Alperton.

Mr. J. C. Moore is now with Associated Electrical Industries, Ltd., Harlow Research Laboratories, Harlow, Essex.

Mr. E. R. Perry has been appointed Chief Metallurgist of Delaney Gallay, Ltd., London.

Major P. L. Teed, of Vickers-Armstrongs (Aircraft), Ltd., recently delivered the 50. Stuttgart Luftfahrtgespräch on " The Fatigue Strength of Aircraft ".

Dr. J. H. Watson, Chief Assayer, Royal Mint, has been elected a Fellow of the Imperial College of Science and Technology.

Dr. W. W. Webb has been appointed Assistant Director of Research, extractive metallurgy, of Union Carbide Metals Co.

Dr. Curtis L. Wilson, Dean of the Missouri School of Mines and Metallurgy, has been elected Vice-President of the American Society for Engineering Education.

Deaths

The Editor regrets to announce the death of:

Professor John Harold Andrew, D.Sc., formerly Professor of Metallurgy in the University of Sheffield.

Major Datta Laxman Deshpande, M.Sc., M.I.Mech.E., Director of the Bihar Institute of Technology and Director of Technical Education for Bihar State, India.

OBITUARY

Professor C. W. Dannatt

Professor Cecil William Dannatt died on 9 April at the age of 68, three years after his retirement from the Royal School of Mines. His long association with the School dated from 1910, when he entered as a student of metallurgy, and was interrupted only by a period of eight years during and following the First World War. For four of these years he was on army service with the Queen's Westminster Rifles, in France, Greece, and Palestine. Then he spent two years in Egypt as Assistant Director of a technical section of the Ministry of the Interior, and finally about two years in Trinidad on geological and surveying work for an oil company.

In 1923 he returned to the Royal School of Mines and joined the teaching staff of the Metallurgy Department. He became Assistant Professor and Reader in 1937, and in that capacity accompanied the Department to Swansea, where it was evacuated to join the University College for the duration of the war. He was given charge of the Department when Sir Harold Carpenter died in Swansea, and he was able to bring it back to the Royal School of Mines in the closing stages of the war, still functioning efficiently, though with meagre equipment and a much-depleted staff. He then had the task of building up the Department again, not merely to restore it to its pre-war capacity, but to expand it considerably to cope with the influx of men released from the Services, and this had to be done with the least possible delay. He did it with complete success, and his appointment in 1945 to the position of Head of the Department and Professor of Metallurgy, was a fitting recognition of the achievement. Research activities in the Department had been stopped by the war, but he soon had them under way again, and his efforts in this direction culminated in the formation of the Nuffield Research Group in Extraction Metallurgy, now a leading school of research in this field.

Professor Dannatt had a charming personality and was a delightful host. He worked long and intensively, but he was always approachable, and seemed indeed to welcome interruptions by his colleagues and students, and by anyone who

DISTORTION IN TOOL STEELS

A NEW BOOK PUBLISHED BY AMERICAN SOCIETY FOR METALS

Distortion in Tool Steels is a practical, easy-to-read book exploring the size and shape changes in tool steels which occur during and after processing.

Readers will benefit greatly from the experience of its author. Dr. Lement's background includes both theoretical and practical work in this field and in this book he has sorted the most useful data yet assembled on this expensive problem to industry. His comprehensive knowledge has resulted in this first-of-its-kind book for metals and materials engineers, tool engineers, designers, heat treaters, machinists, mechanical engineers and inspectors.

Dr. Lement places particular emphasis on methods of heat treatment that are necessary for precise dimensional control. The problems encountered in the production of tool steel parts with extreme tolerances (cutting tools, dies, gages, ball bearings, valves, etc.) are treated in detail.

Also, how to prevent significant changes in finish dimensions during storage or under normal service conditions is discussed. How to minimize or eliminate costly finish machining operations by scientific dimensional control is thoroughly explored.

Tables, drawings, charts and graphs highlight the book's eight chapters:

1. CAUSES OF DISTORTION
2. MEASUREMENT OF DIMENSIONAL CHANGES
3. CALCULATION OF SIZE CHANGES
4. CONTROL OF DISTORTION
5. HARDENING
6. COLD TREATING
7. TEMPERING
8. AGING

If you are directly or indirectly related to the manufacture of tool steels or tool steel parts, *Distortion in Tool Steels* is a work of great importance. Dr. Lement writes to the men responsible for tool steel performance. His book represents an opportunity to become fully informed on size and shape changes in tool steels. Order your copy today.

ORDER WITH THIS COUPON

Distortion in Tool Steels—173 P.—8 chapters—illustrated—red cloth cover—6″ × 9″—published by American Society for Metals—written by Dr. Bernard S. Lement—$10.00 per copy. Please add $1.00 for postage.

Please send me ..... copy(s) of *Distortion in Tool Steels*

Name.....

Title .....

Company .....

Street.....

City..... Zone..... State .....

Enclosed find $ ..... Or: Bill me ☐ Bill Company ☐

AMERICAN SOCIETY FOR METALS

Metals Park—Novelty, Ohio

came to him for help or advice, or for any other good reason. Much of his time was spent on committee work, for example at the University, Imperial College, the City and Guilds of London Institute, the Sir John Cass College, Woolwich Polytechnic, and the Ministry of Supply. He was an active member of any committee on which he served, interesting himself in all matters that arose and surprisingly often being expertly knowledgeable about them. He made up his mind quickly, expressed himself tersely, and while it gave him pleasure to be helpful, he could be a formidable adversary when he felt it necessary to oppose.

He had many friends in the Institute of Metals, of which he was a member for more than twenty years, but his leaning was towards the chemical or extraction side of metallurgy rather than the physical side. Thus he gave much time to the affairs of the Institution of Mining and Metallurgy, of which he was a Council member from 1947 to 1950, Vice-President from 1951 to 1954, and President in 1956–57. He was also well known at the Institution of Metallurgists, having been a Fellow since 1946 and Vice-President from 1953 to 1957.

When he retired from the University in 1957, the title of Professor Emeritus was conferred on him, and in 1960 he was made an Honorary Fellow of Imperial College. His interest in metallurgy, and particularly in the education of metallurgists, was not lessened by his retirement, and he was regularly in attendance at the Royal School of Mines, where a room had been reserved for him, till he was incapacitated by the illness from which he eventually died.

M. S. FISHER

LETTERS TO THE EDITOR

What Should the Institute Publish?

Mr. Liddiard has made the very good point that the *Journal* must rely mainly on research workers to provide it with papers. If, then, there is some feeling that the papers at present lack variety and breadth of appeal, should we not ask whether the same is true of the research on which they are based?

So much metallurgical research today appears to be predominantly scientific, in that it is aimed at increasing our knowledge and understanding of metals, rather than technological in the sense of trying to provide the industrial metallurgist with new things to do and better ways of doing what he already does. It is overwhelmingly centred on the product, especially its structure and behaviour, while the processes used to make it and the requisite plant and equipment do not seem to attract the research worker to any great degree. In short, it lacks variety.

Much of the research reported in the *Journal* could also be criticized as being too marginal in its aim in that a merely incremental addition to our knowledge appears to be sought rather than a radical step forward. Of course, it is much more difficult to make a big advance, but so many authors seem, in retrospect, to have set their sights too low to be interesting.

Professor Cottrell hints at a change of scene. I am optimistic enough to hope for a change of heart and that the aspiring young research metallurgist of tomorrow will consider it "U" to be useful and will measure his achievement by such papers as that of Pfann (*Trans. Amer. Inst. Min. Met. Eng.*, 1952, **194**, 747). Then industry will get more of the technological advances it urgently needs and your readers a more interesting *Journal*.

W. C. F. HESSENBERG.

Bromley,
Kent.

Stacking Faults in Niobium

In a previous Note [1] we reported some transmission electron-microscopic observations of stacking-fault ribbons in niobium. A micrograph was also published representing a hexagonal network with extended and contracted nodes. At that time no attempt was made to estimate the stacking-fault energy, as it was hoped to be able to find more such nodes in the course of future work. However, during our further work no such extended nodes were encountered and the ribbon faults were observed only occasionally.

The purpose of this letter is to draw attention to these additional observations and to make some relevant comments.

The stacking-fault ribbons we observed originally were seen frequently in samples annealed in the temperature range 1100–1400° C. They were seen mostly during annealing times of the order of 3–5 h. Further work conducted in order to find out the exact conditions of their appearance failed to give a definite answer. They have since been noticed occasionally after annealing at high temperature, but never after deformation by drawing or by rolling.

As already reported, no splitting of dislocations was observed during the electron-microscope observations. At that time, no movement of the individual dislocations was noticed under the action of stresses introduced by the local electron-beam irradiation. Since that time, in a different sample of metal which had been electron-beam melted and which underwent further purification by sacrificial refining at a high temperature (2000° C), the individual dislocations have been seen moving under the action of the electron-beam irradiation. A few samples were also deformed in tension inside the electron microscope and during simultaneous observation no such splitting has so far been observed.

In addition to the non-reproducibility of these faults from one annealing to another and the fact that they are present only in some of the specimens of the same annealing batch, it is important to stress that these faults have not been encountered since we began work on electron-beam-melted metals. As it is believed that the electron-beam-melted metal is of higher purity than the samples used previously, some doubt is cast on the interpretation given that the purity of the metal was uniquely responsible for the presence of the faults. In the light of these additional observations it appears more likely that segregation of some remaining impurity atoms might change the stacking-fault energy locally and give rise to the stacking fault observed. Therefore, the unique interpretation which is actually given to the presence of interference fringes as characteristic of a real stacking fault should be extended at least to the more general definition of such a fault as, for instance, that recently given by Crussard.[2] In any case, a definite interpretation of the "stacking faults" observed in niobium should wait until the exact conditions of their reproducible formation have been found.

A. FOURDEUX.
A. BERGHEZAN.

European Research Associates S.A.,
Brussels.

REFERENCES

1. A. Fourdeux and A. Berghezan, *J. Inst. Metals*, 1960–61, **89**, 31.
2. C. Crussard, *Compt. rend.*, 1961, **252**, 273.

LECTURES TO LOCAL SECTIONS AND ASSOCIATED SOCIETIES

The Ductile Fracture of Metals

On 7 March members of the South Wales Local Section heard Dr. K. E. PUTTICK lecture on " The Ductile Fracture of Metals ".

He said that recent work on the cup-and-cone fracture of commercially pure copper had shown that the process of separation began with the formation in the neck of the tensile specimen of voids at non-metallic inclusions. Plastic deformation subsequently elongated these holes in the general direction of the tensile axis, and in the interior of the neck the transverse stresses also caused enlargement perpendicular to the axis; eventually the enlarged holes in the centre of the neck coalesced to form a macroscopic fissure, which then spread by absorbing holes in its neighbourhood, towards the surface of the neck. At a certain critical size of this fissure the strain ahead of it became localized in a narrow cone of shear. Along this cone the inclusion holes, previously elongated in the direction of the local maximum principal tension, were reoriented so that they pointed towards the main fissure. This reorientation, effectively producing a series of cracks along the shear zone, resulted in a further localization of flow, and the fissure at this point followed the cone until it reached the surface.

The modification of this process in iron, where the rupture was accompanied by numerous hair-line cracks originating at inclusions, and in ferrous materials containing finely dispersed carbides such as pearlitic steels, was discussed, and some indication given of the pattern of flow and fracture in specimens of large grain size. A brief description of ductile fracture in single crystals of aluminium followed, and finally an account was given of the process of separation in polycrystalline aluminium free of inclusions, which essentially consisted of slipping apart of the two halves of the specimen along a plane of shear.

Continuous Casting of Aluminium Alloys

At a meeting of the Liverpool Metallurgical Society on 20 April 1961, Dr. W. M. DOYLE (High Duty Alloys, Ltd., Research Division, Slough) gave a lecture on " Continuous Casting of Aluminium Alloys ".

He described the basic aspects of the production of good-quality, high-strength aluminium alloy ingots by the vertical fixed-mould, direct chill casting process, which is used for producing solid round or hollow ingots for subsequent fabrication by forging or extrusion and rectangular slabs for rolling. The casting speeds were governed by the alloy composition and the size of the ingot, and the effects of speed of casting on the solidification front and the formation of the air-gap between the ingot and the mould wall were discussed.

Temperature gradients existing in the growing ingot gave rise to stress concentrations which might, in the case of certain high-strength alloys, result in cracking of the ingot. Some of the surface defects occasionally found in continuously cast ingots were described, and the causes of cold shuts, inverse segregation, and surface exudation were explained.

For the benefit of those members of the audience who had not seen the semi-continuous casting of high-strength aluminium alloy ingots, Dr. Doyle showed a short film of the multiple-ingot casting procedure at Redditch.

The lecturer then dealt with a selection of the ingenious moving-mould processes which had been successfully introduced during the last ten years for the production of rod or strip in commercially pure aluminium or in the low-alloy-content alloys. These machines could be integrated or combined with rod or strip rolling mills.

The Properzi belt-and-wheel machine for the production of $\frac{3}{8}$-in.-dia. bar and the Rigamonti machine for the casting of narrow cast slabs were described, together with the Hunter–Douglas process for the production of venetian-blind stock, and the Hazelett process for the casting of wide strip. Aluminium Laboratories Limited had considerably improved the belt-and-wheel process in the design of their Rotary Strip Casting machine, which was suitable for the production of slab up to about 12 in. wide $\times$ $\frac{3}{4}$ in. thick. With the Hunter Engineering Company's process it was possible to produce 36 in. wide $\times$ $\frac{1}{4}$ in. thick strip, coiled ready for re-rolling.

In his conclusions, Dr. Doyle stated that, if the requirement was for a wide range of alloys in several different ingot sizes for subsequent fabrication, the vertical semi-continuous casting process was the best choice. This was the only method currently available for the casting of the high-strength aluminium alloys. For economic operation, the moving-mould, integrated casting and rolling machines required a large demand for either rod or strip in commercially pure aluminium or in a low-alloy-content alloy.

OTHER NEWS

Pittsburgh Diffraction Conference

The annual Pittsburgh Diffraction Conference will be held on 1–3 November 1961, at Mellon Institute, Pittsburgh, Pennsylvania. Sessions will be devoted to metals and alloys, instrumentation, structures, polymers and fibres, refractories, and electron probe, including special sessions on electron diffraction and X-ray diffraction microscopy. The evening meeting will be addressed by Dr. Peter J. W. Debye, Emeritus Professor of Chemistry, Cornell University. Further information can be obtained from T. B. Massalski, Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pennsylvania.

UNIVERSITY OF LEEDS

HOULDSWORTH SCHOOL LIBRARY

The library is anxious to obtain Vol. 1, 1956 and Vol. 2, 1957, of " Metallurgical Reviews ". The original price will be paid for these journals. Please contact The Librarian, Houldsworth School of Applied Science, The University, Leeds 2.